



UNIMORE Dipartimento di
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA Ingegneria «Enzo Ferrari»

L'  academy *incontra Iuri Frosio*

Computational aspects of deep reinforcement learning

Abstract

Deep reinforcement learning has recently emerged as a viable solution for many complex, real world problems. Nonetheless, the development of new deep reinforcement learning algorithms is still badly affected by the numerous instabilities and the long experiment turnaround time. In this talk I will first show how A3C, a standard deep reinforcement learning algorithm, can be accelerated through the adoption of a GPU for inference and training. I will also show that the limited CPU capability for the simulation of a large number of parallel environments as well as the limited CPU-GPU communication bandwidth constitute two significant bottlenecks in this approach. I will finally illustrate our CUDA Learning Environment (CuLE), which allows emulating thousands of Atari games in parallel on the GPU, removing the previously mentioned bottlenecks and opening the door to effective multi-GPU deep reinforcement learning. I will also illustrate few algorithm optimizations that are needed to leverage at best the large amount of data generated by CuLE.

Speaker Bio

Iuri Frosio (<http://research.nvidia.com/person/iuri-frosio>) got his PhD in biomedical engineering at the Politecnico of Milan in 2006. He worked as research fellow at the Computer Science Department of the University of Milan from 2003 and an assistant professor in the same department from 2006 to 2013. In the same period, he worked as a consultant for various companies in Italy and in the US. He joined NVIDIA in 2014 as senior research scientist. His research interests include image processing, computer vision, robotics, parallel programming, machine learning, and reinforcement learning.

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